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**ASSESSING THE INFLUENCE OF PARENT/GUARDIAN VARIABLES ON
SELECT TYPE 2 DIABETES RISK FACTORS AMONG 10 TO 14 YEAR OLD
NORTHERN PLAINS INDIAN YOUTH**

By

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Thesis

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for the degree of

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Assessing the Influence of Parent/Guardian Variables on Select Type 2 Diabetes Risk Factors among 10 to 14 Year Old Northern Plains Indian Youth

Chairperson: Blakely D. Brown

Type 2 diabetes (T2DM) is a growing health concern among American Indian populations. Many behavioral risk factors for T2DM are influenced by the family unit. **Purpose:** The purpose of this study was to assess the influence of certain parent/guardian variables on youth type 2 diabetes risk factors. **Methods:** The parents/guardians of 10-14 year old Northern Plains American Indian youth (n=37) were surveyed regarding their knowledge for physical activity and nutrition, support behaviors for physical activity and nutrition in their youth, and their individual physical activity and nutrition behaviors. Youth variables including physical activity behavior, dietary behavior, and body mass index percentile-for-age (BMI %ile) were also collected. **Results:** Higher levels of parent/guardian physical activity support were correlated with higher youth BMI %ile ($r=0.433$, $p=0.013$). Parent/guardian nutrition support was also significantly correlated with higher youth BMI %ile as well ($r=0.406$, $p=0.021$). Parent/guardian physical activity support and nutrition support were not significantly correlated ($p>0.05$) with youth physical activity behavior or dietary behavior. Parent/guardian knowledge about physical activity and nutrition was not associated with youth physical activity, youth dietary intake, or youth BMI %ile. Parent/guardian nutrition behaviors and physical activity behaviors were also not significantly correlated with youth physical activity, dietary intake, or BMI %ile. **Discussion:** The results for parent/guardian support to be associated with higher youth BMI %ile were unexpected and deserve attention in future research to evaluate the motivating forces behind parent/guardian support of youth physical activity and nutrition. Although parents/guardians have an influential role in the lives of adolescents, this role did not translate broadly to measurable outcomes concerning T2DM risk factors for the 10-14 year old Northern Plains American Indian youth in the study. While this study was not conclusive regarding the influence of parent/guardian factors on youth disease risk factors, this topic merits further research in light of the increasing incidence of T2DM among American Indian youth.

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DEDICATION

This work is dedicated to my family for always thinking I'm a smarter and stronger person than I am; the Jesuit Volunteers and kiddos at St. Labre for giving me the background; and the innumerable people who have redirected me to this point along the journey.

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CHAPTER ONE: INTRODUCTION

Introduction

A concerning health trend is occurring in the United States: people are less active and have poorer diets than in previous decades. Obesity and obesity related diseases are reaching epidemic proportions in the United States ⁽¹⁰⁾. Obesity is strongly associated with risk factors for many diseases and conditions including high blood pressure, high cholesterol, coronary heart disease, stroke, and type 2 diabetes. American Indian and Alaska Native populations have been impacted the most by increasing rates of type 2 diabetes. The Centers for Disease Control and Prevention (CDC) recently reported that American Indians and Alaska Natives are 2.6 times more likely to have diabetes than non-Hispanic whites of a similar age ⁽⁹⁾. Type 2 diabetes rose in the American Indian population by 46% between 1990 and 1998 compared to 29.3% of Caucasian adults in a nationwide study over the same years ^(9, 31). American Indian adolescents had the largest increase in type 2 diabetes among all subgroups reported ⁽⁹⁾; fifteen to nineteen year old females had a 60% increase and 15-19 year old males exhibited an 81% increase in type 2 diabetes between 1990 and 1998 ⁽³¹⁾. During this time period, the prevalence of type 2 diabetes among 15-19 year old American Indians rose from 3.2 to 5.4 cases per 1,000, while individuals under 15 years of age maintained a low prevalence rate of 1.2 per 1,000 ⁽⁴⁾. A 2003 study of cardiovascular disease risks reported ⁽¹⁹⁾ that American Indians in Montana had two to three times higher prevalence of type 2 diabetes than non-Hispanic whites, with 16% of Montanan Indian adults being diagnosed with the disease. Of the adults who did not have diabetes, many exhibited risk factors for developing diabetes. For example, 70% of Montanan Indian adults were overweight and 77% had a family

history of type 2 diabetes ⁽¹⁹⁾. In 1999, 30% of Montanan Indian adult males and 35% of Montanan Indian adult females were obese with a body mass index (BMI) of greater than 30.0 kg/m² ⁽¹⁹⁾. The prevalence rate of diabetes in Montana American Indian youth less than 19 years of age is 2.3% ⁽¹⁹⁾. A recent study reported that 56% of American Indian youth in the K-12th grades attending schools on or near three Montana reservations were overweight or obese ⁽⁸⁾. These rates are much higher than the national average for non-Hispanic, white youth ⁽¹¹⁾. Although it is encouraging that diabetes prevalence rates are much lower in Montana Native American youth than adults, the prevalence of overweight/obesity in K-12th grade Indian students, as well as the increases in incidence of type 2 diabetes among young people, is alarming.

Youth who are overweight are more likely to become obese or develop obesity related diseases as adults ^(22, 26). Specifically, overweight youth have a 70% chance of being obese in their adulthood. If a child has one or more overweight or obese parent, the child has an 80% chance of being obese as an adult ⁽¹²⁾. In 1999, approximately one in every three American Indian and Alaska Native adults was obese by CDC standards ⁽¹⁷⁾. Therefore, it is crucial to establish and put into practice methods to decrease obesity and disease risks for American Indians ⁽²⁴⁾, particularly for American Indian youth.

National programs and resources such as the “*Diabetes Prevention Program*” (DPP), “*Honoring the Gift of Heart Health*” ⁽²²⁾ and “*Just Move It!*” ⁽²⁶⁾ address health disparities in American Indian communities. However, few programs specifically target youth and their families together in an effort to stem the increasing prevalence of obesity and obesity-related disease in the communities. The three aforementioned programs primarily target adults, thereby reducing the potential impact of the presented information

on native youth. For example, 11% of the participants in the DPP multi-center trial were American Indian adults with pre-diabetes from the southwestern United States. The 16-session DPP program focused on nutrition, physical activity, and lifestyle modifications and behavior sessions for these topics were administered to the participants by a trained lifestyle coach. The DPP group decreased their dietary fat to 25% of total kcal and increased their physical activity to 150 min/wk reduced their risk of type 2 diabetes by 58% compared to the placebo group ⁽²⁷⁾. The control group taking glucose lowering medications exhibited a 38% decrease in type 2 diabetes risk compared to the placebo group. “*Honoring the Gift of Heart Health*” is a ten-lesson curriculum for educating American Indian adults about heart disease prevention through activity and nutrition ⁽²²⁾. There are no published studies on the efficacy of this program. “*Just Move It!*” ⁽²⁶⁾ is a campaign organized in American Indian communities with the support of the National Indian Health Board, National Congress of American Indians, and Nike. Organizations that are sponsoring walks, fun runs, health fairs, or other health awareness events can post their information on the Just Move It! site for people to see. While many of the sponsored programs are inclusive of all ages, the website itself is geared towards adults

While adults can successfully engage in lifestyle interventions for health behavior changes, youth are often not responsible for, or capable of, changing some health-related aspects of their lives ⁽¹³⁾. Parents and guardians play an integral role in the eating and exercise habits within the home and extra-curricular environment ^(3, 5, 13). Children whose parents/guardians support nutrition and create opportunities for healthy eating, as well as model healthy behaviors, are more likely to make healthy nutritional choices ⁽⁴⁹⁾. Since parents/guardians mediate the nutrition and exercise environment in the home, how can

they be encouraged to adopt supportive behaviors? Parents/guardians contribute to the health behaviors of their children in many different ways. Parental knowledge, establishment of the home health environment, role model behavior, general parenting style all influence youth nutrition, physical activity, and sedentary behavior ⁽¹⁴⁾. Borra et al ⁽⁷⁾ reported that youth health-education should involve the family unit and address negative connotations about “healthy eating” and “activity” among both youth and their parents/guardians. Parents and guardians can also be made aware of things that are considered supportive health behaviors such as having readily available fruits and vegetables for snacks, not providing high-fat or high-sugar foods, encouraging physical activity, and discouraging sedentary behaviors like video games and other “screen” activities ^(15, 49).

Community based research indicates that combining the knowledge and support of health care workers, parents/guardians, respected adults, and children/adolescents is an effective way to decrease obesity and obesity related diseases in American Indian adolescents and adults ^(13, 14, 15). No research has been directed at determining the relationships between parent/guardian factors and youth behaviors and characteristics that are considered risk factors for type-2 diabetes. This study will specifically address the need for bringing adults and youth together in dialogues about health by assessing if modifiable parent/guardian factors such as knowledge of nutrition and activity, support of their child’s nutrition and activity, and nutrition and physical activity behaviors are related to risk factors for type-2 diabetes in 10-14 year old Northern Plains Indian youth.

Problem Statement

Parents/guardians often have the greatest influence on the nutritional and activity habits of youth. Youth have less control over making lifestyle modifications than adults. How do parent/guardian knowledge, parent/guardian support, and parent/guardian behaviors influence a child's ability to engage in healthy physical activity and nutrition behaviors?

Conventional wisdom indicates parents/guardians who have more knowledge of the benefits and features of healthy eating and activity will pass that knowledge down to their children through habit forming health behaviors. However, there is little research supporting the belief that knowledge of healthy behaviors translates to support of healthy behaviors.

While several research projects have investigated the relationships between various socio-economic and demographic factors and child health, there has been minimal research on the relationships between parent/guardian knowledge, support, and behavior and child health, especially in the American Indian population.

Research Hypotheses

1. Parent/guardian knowledge of nutrition and physical activity will correlate with parent/guardian nutrition and physical activity behaviors.
2. Parent/guardian knowledge of nutrition and physical activity will correlate with parent/guardian support of youth nutrition and physical activity.
3. Parent/guardian knowledge of nutrition and physical activity will correlate with diabetes risk factors in 10-14 year old Northern Plains American Indian youth.

4. Parent/guardian support of youth nutrition and physical activity will correlate with diabetes risk factors in 10-14 year old Northern Plains American Indian youth.

Significance/Rationale of Study

As the prevalence and health care cost of obesity and obesity related diseases among American Indians rises, there is a pressing need for education and prevention strategies for these conditions. Researchers have the responsibility to build upon the themes that previous studies have left unaddressed. Very little research has examined relationships between parent/guardian health behavior knowledge and support and implications of parent/guardian knowledge and support on youth disease risks, and there are no studies reporting these relationships in American Indian populations. This study will address these points by building on previous research from non-American Indian populations. The results of this study could inform future health-promotion programs that attempt to decrease risk for obesity-related disease in future generations of American Indians. According to Everett Rhoades (former Assistant Surgeon General), “A gathering momentum of federal and community efforts directed toward diabetes offers a basis for some optimism that this terrible epidemic [of diabetes among American Indians] will ultimately be controlled ⁽²⁵⁾.” This study is the product of that momentum and will hopefully contribute to the decline of diabetes among American Indians.

Limitations

1. The knowledge, attitudes, and behaviors surveys were adapted from previous studies. Some of these surveys were validated for use in American Indian youth, while others were not. They were pilot tested using an appropriate test

group before being implemented in the study; but they were not validated instruments.

2. Parents/guardians were recruited through the *JOURNEY* to Native Youth Health program. They were contacted by telephone, at their place of work/residence, or when they brought their youth in to the clinic for blood draw measurements required for the *JOURNEY* program. Unfortunately, parents/guardians were not always reachable or available to participate which limited the sample size beyond what was originally expected.
3. While no parents/guardians opted out of the study once they were approached by the researcher, the youth did not always complete all necessary measures. Attrition and measurement refusal were reduced by thoroughly explaining the risks and benefits of the program and associated measures and allowing people a chance to reschedule for other times. Youth were followed up multiple times to encourage their completion of measures.

Delimitations

This study included 37 parents/guardians of youth participating in the *JOURNEY* to Native Youth Health program. The youth were between the ages of 10 and 14 years and in the 5th-8th grades at schools on two Montana Northern Plains Indian Reservations. Study participants were all tribally enrolled members. Students were randomly selected from class lists and contacted to confirm eligibility and willingness to participate. An adult family member of each participant was contacted to participate in measures for the project with the youth. These adults were parents, legal guardians, or other primary

caregivers to the children who were able to complete the pencil-and-paper or researcher administered surveys.

Definition of Terms

The following is a list of terms and their functional definitions for the purpose of this project.

Parent/Guardian:

The primary caregiver of a child. This could include, but is not limited to: a biological parent, an extended family member, or a legal guardian. This person is often, but not necessarily, the person who makes most of the household decisions about physical activity and nutrition.

Parent/Guardian knowledge:

Parent/guardian score on a survey adapted to assess knowledge of general and youth-specific nutrition and physical activity.

Parent/Guardian support:

Parent/guardian score on a survey adapted to assess behaviors that have been indicated as “supportive” in previous studies. This is not a measure of emotional support or love, but simply an assessment of behaviors that support or encourage nutrition and physical activity in youth.

Parent/Guardian health behaviors:

Parent/guardian nutrition behavior (percentage of total dietary intake (kcal) from fat) and physical activity (MET-hr/week).

Youth type-2 diabetes risk factors:

The American Diabetes Association's risk factors for type-2 diabetes in youth include Body Mass Index (BMI) percentile-for age categories: at risk for overweight: >85% - ≤95%, overweight: >95% - ≤97%, and obese: >97%, ethnicity (being American Indian), and family history ⁽²⁾. Physical inactivity and a dietary total fat intake of >30% total kcal from fat can increase risk for overweight/obesity. Thus, these two variables are indirectly related to risk for type 2 diabetes. Increasing physical activity among youth has been shown to decrease type 2 diabetes ⁽²⁸⁾, but more research is needed to determine the necessary type, frequency, and duration for disease prevention in American Indian youth. Being American Indian (ethnicity) and having one or more first- or second-degree relative with type 2 diabetes (genetics) are also risk factors for diabetes. Low socio-economic status and poverty have also been associated with type 2 diabetes risk ⁽³⁰⁾. These conditions are prevalent on all seven Montana Indian reservations. There are more risk factors associated with type 2 diabetes than those listed here, but dietary fat intake, physical activity, and BMI percentile-for-age will be the focus variables for this study.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

In light of the growing obesity problem among youth in the United States and worldwide, many research teams have set out to investigate risks and precursors to this health problem. While it is well documented that engaging in minimal amounts of physical activity and eating high-caloric, high-fat foods leads to higher levels of body fat, higher BMI, and greater disease risks ⁽¹¹⁾, the relationship between parent/guardian behaviors and youth health behaviors that impact health risk has not been thoroughly examined. This literature review covers topic areas reporting the relationships between parent/guardian health knowledge and support of healthy behaviors and child health behaviors, obesity, or obesity-related disease risks. Additionally, this literature review addresses previous research that has established a link between parent/guardian physical activity or nutrition behaviors and youth health outcomes.

The topics to be covered are: 1) studies that have examined the implications of parent/guardian knowledge of youth health behaviors, 2) studies that have investigated the role of parent/guardian support for youth health behaviors, and 3) studies that have assessed the relationship of parent/guardian behavior modeling on youth health behaviors. The scarcity of relevant health research among American Indian populations precluded the exclusive overview of American Indian and Alaska Native specific studies in this review. Studies that sampled a multi-ethnic population were selected when available over studies that focused solely on Caucasian or non-Hispanic white populations. While the literature review will detail previous studies, it will also point out deficiencies and gaps leading to the research questions and the current study proposal.

Implications of Parent/Guardian Knowledge for Supporting Youth Health Behaviors

In the qualitative phase of a multi-part study, Borra et al.⁽⁷⁾ conducted 16 focus groups in Chicago, IL and Baltimore, MD with parents, teachers, and children to determine knowledge and attitudes about nutrition and activity, healthful lifestyles, and health education strategies. The participants were a mix of ethnic, socioeconomic, and other demographic backgrounds. Results showed that parents did not believe that childhood overweight was a problem unless it prevented children from keeping up physically or socially with their peers⁽⁷⁾. Reasons cited for parents not taking action regarding childhood overweight included 1) belief that the child would outgrow the excess weight, 2) lack of knowledge of how to effectively support their child, or 3) fear that they would inadvertently contribute to unhealthy eating patterns in their children such as anorexia nervosa⁽⁷⁾. Of the parents who acknowledged the problem of childhood overweight, many expressed a reluctance to intervene with their child saying that they needed to “pick their battles” (with the child) and downplayed the significance of their child’s weight. Also, parents who were themselves overweight felt hypocritical about addressing their children’s weight when they were not “practicing what they preached.” A key concept from the parent focus groups emphasized a feeling of helplessness⁽⁷⁾. Parents felt that if they did not provide the unhealthy snacks that the children wanted, they would just go to a friend’s house or somewhere else where they could get the foods. Parents expressed that while they believed it was their responsibility to ensure their children develop healthy habits, they did not know how to motivate children to eat right and be more active⁽⁷⁾.

The next phase of this study implemented a communications program for parents and children to engage in healthier lifestyles ⁽⁷⁾. Some of the communication components included fact sheets on healthy foods and increasing physical activity, referrals to community experts (dietitians, doctors, recreation experts), websites geared specifically toward parents and children with fun interactive tips for activity and eating healthier (including motivational incentives like music downloads), and community support resources for parents and children ⁽⁷⁾. The community support resources included networking for youth physical activity, fitness programs, and community health classes. While the study did not specifically measure the role of parental influences on youth health or health behaviors, the focus group data show many parents felt they lacked knowledge or skills to help their child combat weight through nutrition and physical activity ⁽⁷⁾. Follow-up data from the implemented program were not published at the time of this research.

In their 2000 study on the determinants of adolescent physical activity and inactivity, Gordon-Larsen, McMurray, and Popkin ⁽¹⁵⁾ probed into various environmental and socio-demographic factors associated with youth activity and inactivity. Using 1996 National Longitudinal Study of Adolescent Health data (over 20,000 students in grades 7-12: 16.7% non-Hispanic Black, 12.7% Hispanic, 4.0% Asian), researchers examined associations between age, ethnicity, maternal education level, family income, use of recreation center, and participation in weekly physical education courses. Maternal education level was significantly associated with decreased likelihood of high youth inactivity levels regardless of ethnicity or other socio-demographic variables (“some college” or “college” education level: $p \leq 0.05$ and “graduate or professional degree”

level: $p \leq 0.001$)⁽¹⁵⁾. While the study did not assess knowledge for specific health behaviors such as nutrition or activity, the results indicate that children with more educated mothers spent less time engaging in sedentary behaviors than children with less educated mothers⁽¹⁵⁾.

In 2007, Cottrell et al.⁽¹³⁾ used questionnaires and child screening measures to compare parent knowledge and behaviors to child cardiovascular disease risks. Parents of children participating in a school-based rural health initiative for kindergarten ($n=110$), 5th grade ($n=63$), and 9th grade ($n=71$) students completed questionnaires related to parent health knowledge, health attitudes, and health behaviors. Parents also completed screening forms about family history of cardiovascular disease, smoking, and diabetes and family demographics. The sample was predominantly Caucasian (approximately 80%) and selected from free health screenings in select rural Appalachian schools. There were no significant differences between the parents of overweight, normal weight, and underweight children regarding the parents' health knowledge or attitudes. The only significant difference in parent behaviors was that parents of kindergarteners were more likely to use sweets as a reward than the parents of 5th or 9th grade students ($p \leq 0.001$)⁽¹³⁾. The majority of parents indicated that they had goals for their children's physical activity and nutrition⁽¹³⁾. Data reported discrepancies between the parents' perception of their children's weight and their actual weight⁽¹³⁾. This skewed perception of a child's weight, the researchers inferred, could be a reason that parents do not have their children participate in health screenings, prevention programs, or interventions⁽¹³⁾. In light of this, the researchers anecdotally reported that the ongoing rural health intervention could be a source of increased parent knowledge to promote healthy perceptions of disease risks and

promote the utilization of available health screenings or programs. The investigators suggested future work with parents to help them understand their role in helping children lead healthy lifestyles and increase parent modeling of healthy behaviors such as proper nutrition and physical activity ⁽¹³⁾.

Grey et al. ⁽¹⁶⁾ measured the change in nutritional knowledge and self-efficacy for health behaviors in parents and children and fasting insulin levels in children during a type 2 diabetes prevention program implemented in middle schools. Forty-one students from two middle schools who met eligibility criteria for BMI and family history of type 2 diabetes participated in the program. Each student selected a family member (parent, grandparent, guardian) to participate in the program with them and was randomized to the experimental or control group. Students from both schools received a family-centered and culturally sensitive nutrition education and physical activity training. In addition to the health behavior education, the experimental school also received a coping skills training (CST) intervention. The intervention took place over the course of 16 weeks on weeknights after school. The nutrition education was 45 minutes once a week and the physical activity program was twice weekly for 45 minutes. The CST group received their treatment during the nutrition education. The registered dietitian for the project and an advanced practice nurse telephoned the subjects weekly during the summer months to help support and track the diet and activity goals. Baseline data collection showed that the students all had BMIs greater than 30 kg/m^2 (because most participants were determined to be at or near adult height, absolute BMIs were used instead of percentiles for BMI) and were from three ethnic backgrounds: 51% African-American, 44% Hispanic, and 5% Caucasian ⁽¹⁶⁾.

Results reported significant improvements among parents and grandparents in overall health knowledge including increased health responsibility ($p = 0.03$), healthier nutrition choices ($p = 0.05$), improved stress management skills ($p = 0.05$), and increased physical activity ($p = 0.2$)⁽¹⁶⁾. Some parents and grandparents reported losing weight through this program and said their children requested healthier foods and had inspired them to improve their nutrition and physical activity. Investigators reported the health education and CST group lowered their glucose ($p = 0.07$) and insulin ($p = 0.2$) levels after one year more effectively than the group receiving only health education alone⁽¹⁶⁾. These results suggest that incorporating problem solving, contingency planning, conflict resolution, and cognitive behavioral modification into future health education interventions can help reduce risk factors associated with diabetes⁽¹⁶⁾. Further, involving parents indirectly in the health program could reduce adult risk factors for chronic disease and facilitate whole family health behaviors.

In a study designed to gauge parents' and caregivers' concerns about childhood obesity, Styles et al⁽⁴⁴⁾ led focus groups for parents of children with weight problems. The focus groups elicited participant concerns about childhood obesity, how to promote healthy lifestyles, family dynamics, and child TV/video game playing time. There were eight focus groups for the 54 participants: 3 Black, 2 Hispanic, and 3 White. Over half of the participants had a high school education or less and nearly half had total household annual incomes below \$20,000⁽⁴⁴⁾. Common concerns arose over the management of youth weight. For example, participants said they often felt inadequate as healthy role models and lacked sufficient knowledge about nutrition or healthy cooking⁽⁴⁴⁾. In all focus groups, participants said that their children wanted them to play or help them with

homework but the parents and caregivers lacked the time or energy to do so. They also said, by the time they get home from work, it is too dark to encourage children to play outdoors ⁽⁴⁴⁾. Most participants grossly underestimated the amount of physical activity that their children should have by saying that 10 minutes of physical activity every day or every other day would be sufficient. In addition to lack of knowledge about appropriate physical activity, participants expressed a lack of knowledge about healthy food preparation, how to incorporate more fruits and vegetables into meals, and what types of foods supply calcium and other nutrients. While the participants felt they lacked the knowledge, skills, and support to help their child be healthier or improve weight control, they also acknowledged that their participation and role modeling could have a positive effect on their children.

Summary of Implications of Parent/Guardian Knowledge for Youth Health Behaviors

Overall, the research seems to indicate that improved parent/guardian health information could benefit youth health outcomes and that parents/guardians would be receptive to some sort of health knowledge improvement. Given that children typically live with adults, it would be good for youth health programs to provide take-home health information for parents/guardians or otherwise incorporate the family unit. It is important to note that most of the studies either had no or relatively few American Indian participants. Additionally, no studies quantified the relationship between parent/guardian health knowledge and support for youth health behaviors.

The proposed study will build on previous research ^(7, 13, 15, 16, 44) in several ways. It will directly assess the relationship between parent/guardian health behavior knowledge and health behavior support and youth behaviors and disease risk markers.

Parent/guardian health behaviors will also be measured to determine if they are related to the health behaviors of youth. Also, this study will be specific for American Indian youth in the 5th-8th grades and their parents/guardians: a population which has been underreported in the literature.

Role of Parent/Guardian Support for Child Health Behaviors

A cross-sectional study of 10 to 13 year-old children and their parents in New Zealand was conducted to determine the effects of parental influences and the Theory of Planned Behavior (TPB) on child nutrition ⁽²¹⁾. The Theory of Planned Behavior indicates the primary determinant of a voluntary behavior is a person's intention to perform the behavior and that intention is a function of attitude, subjective norms, and perceived behavioral control ⁽²¹⁾. In this study, Hewitt and Stevens ⁽²¹⁾ surveyed 261 students and one of their parents or caregivers. The children completed a survey on the TPB model and five food categories: fruit, vegetable, treat food (such as sweets or chocolate), soft drink, and takeaway (high-sugar, high-fat, or high-salt content). This survey also included subjective norms questions that assessed the child's perceptions of what types of foods or drinks their parents or caregivers would want them to eat ⁽²¹⁾. The parent survey included questions about the perceived responsibility for diet and nutrition, concerns about the child's weight, and parental restriction of food intake and certain types of foods. Child attitudes about nutrition and perceptions of their parents' wishes for their nutritional behaviors were the greatest predictors of dietary intention in this study ⁽²¹⁾. On the other hand, parent-reported child feeding practices did not explain child nutrition behaviors. These results indicate a child's perception of his or her parents' support of their eating habits is more important than the parents' actual behaviors ⁽²¹⁾.

In 2004, Young et al ⁽⁴⁹⁾ studied the association between middle school students' perceptions of parent behaviors and student fruit and vegetable consumption. The study included 366 6th, 7th, and 8th grade students from rural and suburban/urban schools. Thirty-three percent of students received free or reduced price meals (indicating that one-third of the students were of lower socioeconomic status) and nearly 20% of the students were African American, Hispanic, Asian, American Indian, or multiracial subjects ⁽⁴⁹⁾. Students completed surveys about perceived parenting style, parent behaviors, parent control over child eating, parent modeling of fruit and vegetable consumption, perceived fruit and vegetable availability, and self-efficacy for fruit and vegetable consumption. Parent modeling and parent support were significant predictors of fruit and vegetable consumption ($p < 0.05$). Parent support for fruit and vegetable consumption might increase the likelihood of that behavior in situations where fruit and vegetable availability is low ⁽⁴⁹⁾. Perceived parenting style had no significant impact on fruit and vegetable consumption ($p < 0.05$) ⁽⁴⁹⁾. These data indicate that the amount a parent encourages healthy eating and models healthy eating has a greater influence on child eating than control or parenting style ⁽⁴⁹⁾. While the data is based on student-reported perception and not direct measurement of parent support behaviors, it is interesting to note that parent support might mediate healthy eating behaviors. Another study of 878 eleven to fifteen year old subjects yielded similar results ⁽⁵⁰⁾.

Prochaska et al ⁽³⁴⁾ examined the association between adolescent physical activity and social support to determine if this association would vary when social support was split into parent support and peer support. The 2002 study collected data through the PACE+ School Study, which was a randomized, controlled, computer-based physical

activity and nutrition intervention at a suburban public middle school in southern California. The subjects were in the 6th, 7th, and 8th grades and 37% self-classified their ethnicity as “other (Native American, multiracial, or other)”. In addition to the physical activity screening, the students completed a questionnaire assessing parent support and peer support. The parent scale assessed five themes: praise, encouragement, transportation of the adolescent to physical activity settings, participating in physical activity with the adolescent, and watching the adolescent participate in physical activity or sports ⁽³⁴⁾. Investigators found that parent and peer support were significantly correlated ($r = 0.31$, $p \leq 0.01$) with minutes of self-reported physical activity while there were no significant correlations ($r = 0.12$, $p \leq 0.05$) between support and monitored minutes of physical activity. In a standardized composite, four of the parent themes were significantly correlated: participating with the adolescent ($r = 0.20$, $p \leq 0.05$), providing transportation to activity settings ($r = 0.19$, $p \leq 0.05$), watching the adolescent ($r = 0.30$, $p \leq 0.01$), and telling the adolescent that he or she is doing well in physical activity or sports or praise ($r = 0.22$, $p \leq 0.01$) ⁽³⁴⁾. While the results were inconsistent between self-reported and monitored physical activity, the results indicate that certain forms of parental support might increase physical activity in adolescents ⁽³⁴⁾.

Beets et al ⁽⁴⁾ examined the variation between provider and type of social support for youth and youth physical activity. In a survey of 363 5th, 6th, 7th, and 8th grade students at a rural middle school in the Midwest, the researchers measured anthropometric indicators (including standing and sitting height, weight, and biological maturation), physical activity levels, and social support. Social support was broken down into three categories: mother, father, and peer. The results indicate that peer support, but

not mother or father support, predict physical activity and that transportation and praise predict activity level ⁽⁴⁾. While parent support did not influence overall activity, certain types of parent support (transportation and praise) influenced activity intensity.

Additionally, parent support seemed to have a greater influence in the younger students while peer support was a greater factor for the older students ⁽⁴⁾. Because the study was cross-sectional and not longitudinal, it is impossible to determine if early parent support contributed to increased activity in later adolescence or if there is an association between timing of parent versus peer support. Further, the study relied solely on student reported data and did not directly assess any parent variables such as parent perceived support or support for extra-curricular physical activity ⁽⁴⁾.

In their study of adolescent activity and inactivity patterns, Gordon-Larsen, McMurray, and Popkin ⁽¹⁵⁾ described the relationship between recreation center use and physical activity in 7th-12th grade. Their study comprised a national survey of over 17,000 youth and their parents regarding PE activity, community recreation center use, maternal education, family income, and ethnic background. Adolescents who reported using a community recreation center were more likely to engage in moderate to vigorous activity than those who did not use a recreation center ⁽¹⁵⁾. The study only assessed recreation center use, not the availability of such facilities. Since parent support in the form of transportation to physical activity opportunities has been identified as a predictor of physical activity ⁽³⁴⁾, it would be interesting to see how students arrived at the recreation centers. Perhaps parent transportation mediates the use of an available recreation center.

Trost et al ⁽⁴⁵⁾ tested a conceptual model linking parent activity and parent support for physical activity to youth physical activity. Their sample included 380 seventh through twelfth grade students in Amherst, MA. Parent support was measured through a five item survey administered to the parent. Youth physical activity was measured through a one-week activity recall where activities were assigned a MET value according to the Compendium of Physical Activities ⁽¹⁾. The researchers found that parent support for physical activity was related to youth self efficacy for physical activity and reported physical activity behavior as well as to parent physical activity levels ⁽⁴⁵⁾.

Sallis et al. performed a nationwide telephone survey of children in grades 4-12 and their parents to determine correlates of physical activity in youth ⁽⁴¹⁾. The researchers performed hierarchical regression analyses on the data collected from over 1500 child-parent pairs. Youth physical activity was compiled from both the youth and the parent and converted to a standardized score (z score) to give a more accurate picture of youth physical activity than youth self-report alone. Family support was measured using the 15 item scale developed by Sallis et al ⁽³⁷⁻⁴⁰⁾. The researchers found that family support was significantly correlated ($p < 0.05$) to youth physical activity for both boys and girls regardless of age ⁽⁴¹⁾. Although family support had a similar relationship to youth physical activity for boys and girls between the 4th and 9th grades, family support was a greater influence on girls in grades 10-12 (partial $r = 0.375$, $p < 0.001$) than boys in grades 10-12 (partial $r = 0.149$, $p < 0.05$) ⁽⁴¹⁾.

The aforementioned study by Styles et al ⁽⁴⁴⁾ reported supportive parent behaviors in addition to parent knowledge. Focus group participants described feelings of inadequacy regarding role model behaviors for activity and nutrition. Parents reported

often not perceiving their child's weight in the same way that a health care provider does and felt that led to behaviors which might not support healthy weight loss or weight maintenance ⁽⁴⁴⁾. One parent said that family members might support overeating because they think the child needs more food than he or she really does; or they might encourage eating junk food because they feel the child deserves it ⁽⁴⁴⁾. Even if there is knowledge about the benefits of eating healthy or being physically active, there is not always the family support for these behaviors. Parents generally felt that support through participating in activities with their children or encouraging their children to be active would be good for youth health, but they also expressed barriers to support such as safety, time, and lack of knowledge ⁽⁴⁴⁾.

Summary of Parent/Guardian Support for Youth Health Behaviors

Overall, the research seems to indicate that there is a relationship between parent support and nutritional behaviors and physical activity among youth ^(4, 15, 21, 34, 40, 44, 45, 49). Children who believed that their parents were more encouraging of fruit and vegetable consumption were more likely to consume those foods than students who did not perceive this support ⁽²¹⁾. Children whose parents encouraged physical activity were more likely to engage in active behaviors than children whose parents were less supportive of activity ^(34, 45). While several studies have investigated the relationship between parent support of their child's physical activity and nutrition behaviors, no studies have examined the relationship between parent support and youth risk factors for type-2 diabetes, especially in American Indian populations. Thus, the proposed study will break new ground by assessing parental support for youth health behaviors and

report the association between this variable and type 2 diabetes risk factors in American Indian youth.

Role of Parent/Guardian Physical Activity and Nutrition Behaviors for Youth Health Behaviors

Many studies have addressed direct modeling; a hypothesis whereby youth with more physically active adults in their lives will be more physically active, or youth who see adults eating fruits and vegetables will be more likely to choose these foods. Despite the abundance of research on the direct modeling hypothesis, there is not conclusive evidence that parent/guardian health behaviors are adopted by children or adolescents ^(46,47). Additionally, many of these studies have focused on younger children and few include American Indian subjects. The following studies provide a glimpse of the mixed support for direct modeling as a determinant of youth health behaviors.

The aforementioned study by Young et al. ⁽⁴⁹⁾ assessed perceived parent modeling of fruit and vegetable consumption alongside support, parenting style, fruit and vegetable availability, and self-efficacy for eating fruits and vegetables. Perceived parent behaviors were measured through the administration of a modified version of the Child Modeling Scale to 366 sixth-eight grade students (2.5% self-identified as American Indian). Fruit and vegetable availability within the home strengthened the predictive power of perceived parent behavior, but perceived behavior on its own was a moderate direct predictor of youth fruit and vegetable consumption ⁽⁴⁹⁾.

A study designed to assess the relationship between maternal and adolescent dietary behaviors in 121 low-income African American families uncovered weak associations between mother and child dietary patterns ⁽⁴⁸⁾. Dietary intake was measured

using modified food frequency questionnaires that were appropriate for the ages and use in an African American population. Overall, there were weak correlations between mothers and children with regard to dietary variables ⁽⁴⁸⁾. When separated by sex, the correlations were stronger between girls and their mothers than boys and their mother ⁽⁴⁸⁾. Another notable finding was that overweight children exhibited weaker correlations to their mothers than their normal weight counterparts. The researchers hypothesized that part of the reason for the overall low correlations (no variables had a correlation coefficient greater than 0.2) was the low income status of the subjects. Many of the children were consuming one or more reduced cost meals at the schools and the mothers may have altered their own dietary patterns or what they prepare for their family based on their financial situation ⁽⁴⁸⁾.

In the previously described study by Trost et al. ⁽⁴⁵⁾, parent physical activity was included in the model to determine correlates of physical activity in 380 seventh through twelfth grade students. They found that parent physical activity (described as a self-reported composite physical activity score) was not a significant predictor of youth physical activity ⁽⁴⁵⁾. The results indicated that there was a path from parent physical activity to parent support, and from parent support to youth physical activity, but no direct path from parent physical activity to youth physical activity ⁽⁴⁵⁾.

The 1999 study by Sallis et al. also analyzed the influence of parent physical activity on youth physical activity ⁽⁴¹⁾. This sample for this study was drawn from across the nation and included minority populations in the sampling; approximately 1% of the sample comprised American Indian subjects, 14% African American, 9% Hispanic, and 1% Asian/Pacific Islander. Demographic variables (ethnicity, parent education level, and

single parent status) were responsible for less than 2% of the variance in youth physical activity. For boys in the 7th-9th grades, parent physical activity behavior emerged as a variable in the regression model, but not a significant one; parent physical activity was not a correlate of physical activity for boys in grades 10-12. Parent physical activity behavior was not a correlate of child physical activity for girls of any age ⁽⁴¹⁾.

Summary of Parent/Guardian Health Behaviors

The literature is decidedly inconclusive regarding the impact of parental physical activity and dietary behaviors on youth health behaviors. No studies have assessed this relationship in an exclusively American Indian population, and most rely on self-reported data. This study will improve upon previous research by using gold-standard techniques to measure physical activity and dietary intake in American Indian youth. Adults will complete instruments similar to the ones used in previous research. This study will seek to establish a link between parent/guardian knowledge of healthy physical activity and nutrition and personal health behaviors as well as between personal health behaviors and those of youth.

Review of Survey Instruments

For this study, the survey instrument needed to be both brief and yield a good picture of parent/guardian health behavior knowledge, support, and behaviors. The five instruments utilized were from the Pathways intervention ⁽⁴²⁾, the PARADE study ^(18, 36), the Amherst Health and Activity Study ^(34, 37-40, 45), the Modifiable Physical Activity Questionnaire ⁽²⁹⁾, and the Block Brief 2000 Food Frequency Questionnaire ^(6, 33).

The Pathways intervention utilized a reliability tested, construct validated, culturally- and age-appropriate questionnaire ⁽⁴²⁾. The aims of the questionnaire were to

assess physical activity, diet, weight-related attitudes and behaviors, and cultural identity in third-fifth grade American Indian youth. The questionnaire was initially constructed after conducting a thorough review of existing questionnaires and consultations with experts. The initial draft was then reviewed by curriculum design and field instruction teams and reduced from 248 questions to 170 questions. A subset of the questionnaire was validity tested with 32 American Indian students using semi-structured interviews. During a two-day meeting, 16 Pathways staff members (including eight American Indian staff members) reviewed and examined each item one-by-one. This step eliminated 40 questions and revised the remaining 130. The questionnaire was then approved by the Pathways Study Steering Committee and five tribes. The diet sections of the final version of the questionnaire include questions about food selection, fat and sugar knowledge, and identification of high-fat foods.

The PARADE study assessed several behavioral variables associated with cancer in high risk populations^(18, 36). The instrument was developed to assess components of an intervention focused on lowering fat content and increasing fruit and vegetable consumption in ethnically diverse urban school-aged children⁽¹⁸⁾. An extensive review of the literature uncovered no studies that addressed the development or validation of these instruments.

The Amherst Health and Activity Study (AHA) assessed physical activity and health habits of children and teenagers and family and friend support for these habits. Adults and children were surveyed regarding physical activity type and frequency, environmental factors, household influences, physical activity of adults in the household, the household demographics, the child's friends, the social support and exercise, and

social support and exercise⁽³⁸⁻⁴⁰⁾. The abbreviated versions of the social support and eating habits and social support and exercise surveys contain 10 and 13 questions respectively⁽³⁸⁻⁴⁰⁾. Each question was scored on a one to five point Likert scale (none/does not apply, rarely, a few times, often, or very often) for both family and friend support. For the eating habits, family and friend support were categorized into encouragement and discouragement factors. For exercise, family and friend support were categorized into participation and rewards/punishment. The support surveys developed and validated for the AHA have also been used or adapted in several other studies, including the described studies led by Beets et al.⁽⁴⁾, Prochaska et al.⁽³⁴⁾ and Trost⁽⁴⁵⁾.

The Modifiable Activity Questionnaire was originally developed by Kriska et al.⁽²⁹⁾ to assess physical activity among Pima Indians. It has since been adapted for use in many different populations. To complete the survey, participants are shown a list of 39 common physical activities or forms of exercise and asked to report how many months in the past year they have performed the activity as well as how many times per month, and how many minutes per time they engaged in the activity. Using the Compendium of Physical Activities⁽¹⁾ each physical activity was assigned a metabolic expenditure equivalent (MET) and converted to MET hours per week spent in each activity. The MET-hours/week were then summed to determine average weekly physical activity over the past year.

Food frequency questionnaires are used to determine typical eating patterns of an individual. They are less burdensome on the participant than food records or dietary recalls, but at the cost of some accuracy. The food frequency questionnaire used for this study was originally developed by Gladys Block from the National Cancer Institute⁽⁶⁾. A

list of validation and reliability studies and publications can be found at the NutritionQuest website ⁽³³⁾. The Block Brief 2000 Food Frequency Questionnaire was developed out of a need for a shorter instrument to assess dietary. It contains approximately two-thirds as many food items as the previously developed food frequency questionnaires and has been used in numerous studies.

Chapter Three: Methods

Research Setting

This study was conducted in American Indian youth age 10-14 living on two Northern Plains Indian reservations in Montana and their parents/guardians. This was an ancillary study to the larger, NIDDK-funded, two-year planning study, *JOURNEY* to Native Youth Health, investigating the feasibility of implementing an age- and culturally-specific diabetes prevention curriculum in American Indian youth, ages 10-14 living on two Montana reservations. Trained on-site project directors and assistant project directors conducted the recruitment of subjects, physical measurements of youth (with the help of trained health care personnel), youth assessment surveys, and administered the youth health curricula.

Procedures

Recruitment and Subjects

Prior to subject recruitment and data collection, all research procedures were approved by the University of Montana Institutional Review Board. Student subject lists were generated by the local elementary and middle schools and sorted by grade level at each test site. These lists were then computer randomized. Starting from the top of the list, the program staff member sequentially recruited each student to participate in the *JOURNEY* program. If the 5th – 8th grade student was eligible for the program, project staff explained the study to the parent/guardian. If parent/guardian consent and child assent were both obtained, the child was enrolled in the *JOURNEY* to Native Youth Health study. During the *JOURNEY* to Native Youth Health youth pretest measures, the researcher contacted parents/guardians of the participating children to complete the adult

surveys and behavioral measures. The parent/guardian subjects were informed of the purpose and procedures of the study and provided written consent before completing the parent/guardian survey measures (see Appendix 1 for Informed Consent).

Youth Measurements

Although more anthropometric, biological, and fitness measures were performed as part of the larger *JOURNEY* to Native Youth Health project, the measures used to assess diabetes risk for this part of the study included: height and weight (to determine BMI percentile for age), dietary recall, and monitored physical activity (using accelerometry).

Height and weight were measured by a member of the research team or a staff member at the health clinic when the adolescent was undergoing the various pretest measures.

Youth dietary recall was performed by three, 24-hour diet recalls. In a meeting with a member of the research team, the youth was trained in how to record the foods and beverages that he or she consumed. Food models were used to help the youth quantify the amount of foods and the member of the research team helped the child record his or her first few meals of recall. The youth were encouraged to write down what they ate with as much detail as possible soon after they ate. The following day, the child returned with the diet recall sheets for the interviewer to clarify the quantities of food as well as to probe for any neglected items (“I see that you didn’t write down any drinks after 3 PM yesterday. Did you have anything to drink with dinner?”). This process was repeated until three 24-hour periods of dietary data were collected. The handwritten dietary recalls

were entered into Food Processor v. 10.2.2 (ESHA Research, Salem, OR) for nutrient analysis.

Physical activity monitoring was performed using Actical® omnidirectional accelerometers (MiniMitter Co. Inc, Bend, OR). The adolescents were fitted with an Actical® on the wrist of their non-dominant arm using a waterproof and non-removable plastic wristband. The Actical was set to begin recording physical activity in one minute epochs starting at midnight after the wristband was placed. The Actical was worn continuously for 7 days, after which the wristband was cut off by a member of the research team and the Actical® data was downloaded to a research computer. The raw Actical data were downloaded to a research computer and analyzed using Microsoft Office Excel 2007 (Microsoft Corporation, Redmond, WA). An Excel program was developed by the University of Montana Human Performance Lab to convert the raw accelerometer count data into kcal/kg/min using validated regression data previously developed by Heil et al ⁽²⁰⁾. To categorize physical activity intensity for children, the present study used the cut points defined by Puyau et al. ⁽³⁵⁾: sedentary and light intensity activities $< 0.05 \text{ kcal} \times \text{kg}^{-1} \times \text{min}^{-1}$; $0.05 \text{ kcal} \times \text{kg}^{-1} \times \text{min}^{-1} \leq$ moderate intensity $< 0.10 \text{ kcal} \times \text{kg}^{-1} \times \text{min}^{-1}$; vigorous intensity $\geq \text{kcal} \times \text{kg}^{-1} \times \text{min}^{-1}$. Moderate and vigorous physical activity counts were averaged over the measurement period and summed to determine average daily moderate-to-vigorous physical activity (MVPA). Only adolescents whose Acticals recorded 3 or more full days of activity were included in the physical activity analyses. All survey data were collected from study participants before they began diabetes prevention or alcohol prevention lessons for the *JOURNEY* to Native Youth Health program.

Parent/Guardian Measurement

The researcher administered surveys to the parents/guardians with the assistance of on-site project staff. These surveys assessed three constructs: knowledge, support, and personal nutrition and physical activity behavior.

Development of Parent/Guardian Survey Measures

Three parent/guardian variables were assessed through the surveys: knowledge about healthy nutrition and physical activity for their youth, support behaviors for healthy nutrition and physical activity for their youth, and parent/guardian nutrition and physical activity behaviors.

Knowledge Instrument

There is not a comprehensive knowledge survey for adults addressing various aspects of youth-specific nutrition knowledge as well as physical activity. Items from the Pathways nutrition knowledge, attitudes, and beliefs questionnaire ⁽⁴²⁾ and items from the PARADE study survey ⁽³⁶⁾ for fat and fruits and vegetables were adapted and supplemented with researcher-developed questions for physical activity. The Pathways study was completed with American Indian school children in the Southwest region of the United States and the PARADE study was completed with ethnically diverse urban populations. The physical activity questions were based on American College of Sports Medicine and the Centers for Disease Control and Prevention physical activity guidelines for youth. This was a paper and pencil survey. The researcher explained the instrument and then the subject completed it individually to reduce the likelihood of providing socially desirable responses. Because this survey had not been previously validated in

American Indian adults, it was first pilot tested by a small group of American Indian adults and reviewed for content by experts in youth nutrition and physical activity.

Support Instrument

The support instrument was initially developed for the Amherst Health and Activity study by Sallis et al ⁽³⁷⁻⁴⁰⁾. There are two 15 item surveys, one for physical activity support within the past three months, and one for nutrition support within the past three months. The wording of the instrument was modified minimally to reflect parents/guardians describing their support behaviors for youth (as opposed to youth describing their parents' support behaviors). The researcher explained the instrument and the subject completed the paper and pencil survey on her/his own. Responses were coded on a five point Likert scale ranging from one (none) to 5 (very often). Because this instrument had not been tested in a predominantly American Indian population, reliability statistics were performed on the scales, both separately and combined as a single instrument. The three analyses indicated high levels of internal consistency (physical activity $\alpha = 0.862$, nutrition $\alpha = 0.897$, and combined $\alpha = 0.886$).

Behavior Instruments

Parent past-year physical activity was measured using the Modifiable Physical Activity Questionnaire ^(28,29) originally developed by Kriska et al. for use among Pima Indians. It is a paper and pencil survey that was explained by the researcher and completed by the subject. This instrument measures both leisure-time and occupational physical activity over the past year as well as physical inactivity due to illness, injury, or disability. Leisure-time activity responses were converted by the researcher into metabolic equivalent hours per week (MET hours/week) using the MET values for

various activities defined in the Compendium of Physical Activities ⁽¹⁾. A metabolic equivalent (MET) is defined as the metabolic cost at rest, or 3.5 ml/kg/min of oxygen consumption. The following equation was used to convert participant responses into the desired variable:

$$\text{MET value of activity} \times \frac{\# \text{ months}}{\text{year}} \times \frac{\# \text{ episodes}}{\text{month}} \times \frac{\# \text{ minutes}}{\text{episode}} \times \frac{1 \text{ year}}{52.143 \text{ weeks}} \times \frac{1 \text{ hour}}{60 \text{ minutes}}. \text{ The}$$

American College of Sports Medicine recommends that adults accumulate at least 30 minutes of moderate (3-6 METs) physical activity most days of the week⁽³⁵⁾, which is equivalent to 10.5-21 MET hours/ week.

Parent past-year nutrition behavior was measured using the Block Brief 2000 Food Frequency Questionnaire ⁽⁶⁾. This instrument was administered by the researcher. Subjects were shown pictures of various food quantities ranging from 1/4 cup to 2 cups and asked to state how often and how much they consumed of certain types of foods (70 food items were included based on the NHANES III national dietary recall data ⁽³³⁾). The researcher filled out the paper and pencil (fill-in-the-bubble) computer-scored questionnaire and offered reminders to evaluate food patterns over the whole year, not simply for the current season, as well as reminders for responding individually (“remember that this is just what *you* ate, not what you served your family or what you *wanted* to eat”). The completed food frequency questionnaires were mailed to NutritionQuest (Berkeley, CA) for data analysis. Block food frequency questionnaires have been used extensively for research across various ethnicities, ages, and sexes in the United States. The version used was a revised version of the original full instrument developed by Block et al ⁽⁶⁾.

This entire survey battery took most subjects between 30 and 40 minutes to complete. Subjects were given a \$10 incentive for completing the surveys. Although 100% of the parents/guardian consented to the study participated in the survey, only 70% of participants completed all portions of the survey in their entirety.

Research Design and Statistical Procedures

The design for this study was descriptive and quantitative and the data were of the interval and ratio levels. Parent/guardian and child data were linked and anonymously coded using the subject identification number to protect the subjects' privacy. The data were coded and entered into Microsoft Office Excel 2007 (Microsoft Corporation, Redmond, WA) for organization and storage. Statistical analyses were performed using SPSS 16.0 for Windows (SPSS Inc., Chicago, IL) a computer based data analysis software program. Significance was set at the $p < 0.05$ level. In addition to subject descriptive data, the following bivariate correlations were performed to answer the four hypotheses posed in the introduction:

Parent/Guardian knowledge and

- Parent/guardian leisure time physical activity
- Parent/guardian nutrition
- Physical activity support
- Nutrition support

Parent/guardian knowledge and

- Youth BMI percentile for age
- Youth minutes of moderate to vigorous physical activity
- Youth percentage of total kcals from fat

Parent/Guardian physical activity support and

- Youth BMI percentile for age
- Youth minutes of moderate to vigorous physical activity

Parent/Guardian nutrition support and

- Youth BMI percentile for age
- Youth percentage of total kcals from fat

Parent/Guardian nutrition and

- Youth BMI percentile for age
- Youth percentage of total kcals from fat

Parent/Guardian leisure time physical activity and

- Youth BMI percentile for age
- Youth minutes of moderate to vigorous physical activity

CHAPTER 4: RESULTS

The purpose of this study was to determine the relationship between parent/guardian variables and type 2 diabetes risk factors among 10-14 year old Northern Plains Indian youth. Relationships between parent/guardian factors are also described.

Descriptive Results

A total of 37 parents/guardians participated in the study. A description of demographic characteristics of these adults is detailed in Table 1. Although 37 adults completed the surveys, not all of their corresponding adolescents completed the pre-test measures for the *JOURNEY* to Native Youth Health program. There were 34 youth who completed enough of the measures to report descriptive statistics (including BMI percentile-for-age). Many of the 34 participating youth did not complete one or more of the youth measures (including the dietary recalls or physical activity monitoring). Because of the varying sample size, the number of cases will be reported for each statistical analysis ($n=x$). The 34 youth ranged in age from 10 to 14 years ($\bar{x} = 11.2 \pm 1.2$) and were evenly divided between sexes (17 female and 16 male). Results of the youth dietary recall measure, physical activity monitoring measure, and BMI percentile-for-age calculation are shown reported in Table 2.

The parent knowledge and support surveys were scored and converted to standardized variables (z scores, such that $\bar{x} = 0 \pm 1$). The standardized scores are the reported values throughout the results section. A description of parent/guardian physical activity and nutrition behaviors is included in Table 2.

According to the Shapiro-Wilk test of normality, the values were normally distributed for parent/guardian knowledge ($p=0.232$), parent/guardian physical activity

support ($p=0.499$), parent/guardian nutrition support ($p=0.445$), and parent/guardian percent of dietary intake from fat ($p=0.501$), but not for parent/guardian physical activity behavior ($p<0.001$). Two parent/guardian physical activity surveys were filled out incorrectly such that physical activity was dramatically overestimated. These surveys were not included in the analysis. The distributions were normal for youth BMI percent of dietary intake from fat ($p=0.230$) and youth physical activity ($p=0.332$), but not for youth BMI percentile-for-age ($p<0.001$). Due to the assumptions of normality required for a Pearson product moment correlation, Spearman rho correlations were performed on all data.

Statistical Analyses

To determine if parent/guardian knowledge of healthy nutrition and physical activity was related to parent/guardian nutrition and physical activity behaviors, Spearman rho correlations were performed between parent/guardian score on the knowledge survey and parent/guardian physical activity, and percentage of dietary intake from fat (Table 3). Knowledge score was not significantly associated with higher parent physical activity ($r=0.125$, $p=0.580$). There was however, an association of borderline significance for parents/guardians who scored higher on the knowledge survey to consume a lower proportion of fat (-0.340 , $p=0.057$).

There were effectively nonexistent correlations between parent/guardian score on the knowledge survey and physical activity support ($r=-0.084$, $p=0.646$) or nutrition support ($r=0.008$, $p=0.966$) as described in Table 3.

Spearman rho correlations were also performed between parent/guardian knowledge score and three youth diabetes risk factors: BMI percentile for age, minutes of

MVPA per day, and percentage of total dietary intake from fat. These correlations are shown in Table 4. Parent/guardian knowledge score was not significantly associated ($p<0.05$) with any of the youth diabetes risk variables.

There was a strong, significant correlation between parent/guardian nutrition support and parent/guardian physical activity support score ($r=0.676$, $p<0.001$) (Table 3). Parent/guardian nutrition support was not significantly associated with youth dietary behavior, but the directionality of the relationship was unexpected (Table 4). Analysis excluding youth BMI %-for-age outliers showed parent/guardian nutrition support did not significantly correlate with youth BMI %-for-age ($r=0.313$, $p=0.092$). Parent/guardian physical activity support was significantly associated with youth BMI percentile-for-age ($r=0.433$, $p=0.013$), although this association weakened, when analysis excluded the youth BMI %-for-age outliers ($r=0.366$, $p=0.047$) (Table 4). Parent/guardian physical activity support was not significantly correlated with youth minutes of moderate-to-vigorous physical activity ($r= -0.066$, $p=0.758$), as seen in Table 4.

Spearman rho correlations were performed between parent/guardian behavior variables and youth behavior variables (Table 5). There were no significant relationships between parent/guardian nutrition behaviors and either youth BMI percentile-for-age or youth nutrition behaviors. Parent/guardian physical activity behaviors were also not significantly associated with either youth BMI percentile-for-age or youth physical activity behaviors.

Table 1. Description of parent/guardian characteristics
(n=37)

Age*	44.2 ± 7.6
Sex	
Female	32
Male	5
Ethnicity	
American Indian	36
Hispanic	1
Relationship to the Child in the Study	
Biological Parent	28
Legal Guardian	5
Other close relative	4
Highest Education Level Reached	
Some H.S.	6
H.S. diploma/ GED	8
Some College	5
Associate Degree	14
College Degree	2
Graduate Degree	2
Annual Household Income	
<\$10,000	6
\$10,001-\$20,000	3
\$20,000- \$30,000	10
\$30,001-\$40,000	6
\$40,001-\$50,000	6
>\$50,000	3
Household Decision Maker (Food)	
Yes	32
No	5
Household Decision Maker (PA)	
Yes	26
No	11

*Age presented as mean years ± SD, all other data presented as frequency

Table 2. Descriptive statistics for youth and parent/guardian variables

Variable	Mean ± SD (range)	Range
Youth BMI percentile-for-age <i>n</i> =32	75.3% ± 27.83	4-99%
Youth MVPA (minutes/day) <i>n</i> =24	103.0 ± 61.6	0-219
Youth % of kcals from fat <i>n</i> =15	32.1% ± 6.2	24-45%
Parent/guardian PA (MET-hr/week) <i>n</i> =26	12.85 ± 15.94	0.29-60.03
Parent/guardian % of kcals from fat <i>n</i> =37	41.56% ± 6.22	25.6-52.2%

Table 3. Spearman rho correlations between parent/guardian variables

	Parent/guardian physical activity support	Parent/guardian nutrition support	Parent/guardian PA behavior (MET-hr/week)	Parent/guardian % of kcal from fat
Parent/guardian knowledge score	-0.084 (p=0.646)	0.008 (p=0.966)	0.125 (p=0.580)	-0.340 (p=0.057)
N	32	32	22	32
Parent/guardian nutrition support	0.676* (p<0.001)			
N	37			

*Correlation is significant at the 0.05 level

Table 4. Spearman rho correlations between parent/guardian knowledge and support variables and youth type 2 diabetes risk factors

	Youth BMI %ile	Youth MVPA	Youth % kcals from fat
Parent/guardian knowledge score	0.045 (p=0.815)	0.157 (p=0.496)	0.353 (p=0.197)
N	30	21	15
Parent/guardian physical activity support	0.433* (p=0.013)	-0.066 (p=0.758)	--
N	32	24	
Parent/guardian nutrition support	0.406* (p=0.021)	--	-0.308 (p=0.265)
N	32		15

*Correlation is significant at the 0.05 level

Table 5. Spearman rho correlations between parent/guardian behavioral variables and youth type 2 diabetes risk factors

	Youth BMI %ile	Youth MVPA	Youth % of kcals from fat
Parent/guardian PA (MET hr/week)	0.220 (p=0.337)	-0.224 (p=0.405)	--
N	21	16	
Parent/guardian % of kcals from fat	-0.201 (p=0.271)	--	-0.286 (p=0.302)
N	32		15

No correlations statistically significant at p<0.05

CHAPTER 5: DISCUSSION

This research assessed the parent/guardian variables of knowledge for healthy physical activity and nutrition, support for nutrition and physical activity behaviors in their youth, individual physical activity and nutrition behavior and how they are related to certain type 2 diabetes risk factors among 10-14 year old American Indian youth. The four initial hypotheses that drove the study design and data analysis are included in this discussion.

Research Hypotheses

1. *Parent/guardian knowledge of nutrition and physical activity will correlate with parent/guardian health behaviors.*
 - a. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with parent/guardian physical activity behavior.*
 - b. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with parent/guardian nutrition behavior.*

Hypotheses 1a was not accepted because parent/guardian knowledge score was not significantly correlated with higher parent self-reported physical activity. Although there was a weak association for the parent/guardian knowledge score to be correlated with lower parent/guardian intake of dietary fat ($p=0.057$), hypotheses 1b was not accepted as this outcome did not meet the established threshold of significance ($p\leq 0.05$).

2. *Parent/guardian knowledge of nutrition and physical activity will correlate with parent/guardian support of youth health behaviors.*

- a. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with parent/guardian support of youth nutrition.*
- b. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with parent/guardian support of youth physical activity.*

While it is assumed that an adult with greater knowledge of behaviors that reduce risk for diabetes would be more likely to offer support for these behaviors to her or his child, the present study did not validate that assumption. Thus, hypotheses 2a and 2b were not accepted because parent/guardian knowledge score was not significantly correlated with either parent/guardian physical activity support or parent/guardian nutrition support.

- 3. *Parent/guardian score on knowledge of physical activity and nutrition will correlate with selected diabetes risk factors in 10-14 year old Northern Plains American Indian youth.*
 - a. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with youth BMI percentile-for-age.*
 - b. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with youth minutes of moderate-to-vigorous physical activity per day.*
 - c. *Parent/guardian score on knowledge survey for physical activity and nutrition will correlate with youth percentage of total dietary intake (kcal) from fat.*

These hypotheses (3a, 3b, 3c) were not accepted because parent/guardian knowledge score was not significantly correlated with youth BMI percentile-for-age, youth minutes of moderate-to-vigorous physical activity per day, or youth percentage of dietary intake (kcal) from fat.

4. *Parent/guardian support of youth nutrition and physical activity will correlate with selected diabetes risk factors in 10-14 year old Northern Plains American Indian youth.*

- a. *Parent/guardian support of youth physical activity will correlate with youth BMI percentile-for-age.*
- b. *Parent/guardian support of youth nutrition will correlate with youth BMI percentile-for-age.*
- c. *Parent/guardian support of youth physical activity will correlate with youth minutes of moderate-to-vigorous physical activity per day.*
- d. *Parent/guardian support of youth nutrition will correlate with youth percent of dietary intake from fat.*

Hypothesis 4a was accepted because parent/guardian physical activity support was positively correlated with youth BMI percentile-for age ($p=0.013$). Hypothesis 4b was also accepted because nutrition support was significantly correlated with youth BMI percentile-for-age ($p=0.021$). Despite the statistical significance of these results, the directionality of the associations were unexpected. Hypothesis 4c was not accepted because there was not a significant relationship between parent/guardian physical activity support and youth physical activity behavior. Hypothesis 4d was not accepted because

parent/guardian nutrition support was not significantly correlated with youth percentage of dietary intake (kcal) from fat.

5. *Parent/guardian nutrition and physical activity behaviors will correlate with nutrition and physical activity behaviors, respectively, in 10-14 year old Northern Plains American Indian youth.*

a. *Parent/guardian nutrition behavior will correlate with youth nutrition behavior.*

b. *Parent/guardian physical activity behavior will correlate with youth physical activity behavior.*

Hypotheses 5a and 5b were not accepted because parent guardian physical activity behavior was not significantly correlated with youth physical activity behavior; nor was parent/guardian nutrition behavior significantly correlated with youth nutrition behavior (percentage of total kcal from dietary fat).

The results indicate that, in this study, parent/guardian factors were not as influential on American Indian youth type 2 diabetes risk factors as expected. The health behaviors associated with type 2 diabetes (physical activity and nutrition) are complex and multi-faceted behaviors that will be influenced by many intrinsic and extrinsic forces over a person's life. The current study had a small sample size which may have decreased the power to find significant correlations for many of the study variables. Despite limitations of the research, many interesting themes emerged during the research process.

Discussion of the Research Process: Developing and selecting surveys

As illustrated in the review of literature, there was not a previously validated tool to assess parent/guardian knowledge for youth nutrition and physical activity. Some of

the non-significant findings of this study could be spurious outcomes resulting from an instrument that had not been previously used or validated. In its current form, the developed 18 item instrument gives a crude snapshot of both general and youth-specific physical activity and nutrition knowledge, but needs to be further developed in future studies to comprehensively and confidently assess this knowledge. Future studies should further test this knowledge-based survey through confirmatory factor analysis and by determining additional reliability (e.g., test-retest reliability and split-half reliability) and validity estimates so that it is a rigorous and robust tool that can be used to assess physical activity and nutrition knowledge in American Indian parents/guardians of 10-14 year olds.

The support instrument was a previously validated and reliability-tested survey that had not yet been used in an exclusively American Indian adult population. The results show a strong positive association between parent/guardian physical activity support and nutrition support ($r=0.676$, $p<0.001$) which indicates support for one behavior increasing proportionately with support for the other behavior. Additionally, both the physical activity support and nutrition support surveys had high levels of internal consistency (Cronbach's $\alpha=0.862$ and 0.897 , respectively). Previous studies using these support surveys or the abbreviated versions of them found Cronbach's alphas ranging from 0.65 to 0.81 ^(23, 34, 45). These studies included larger sample sizes and examined youth perceptions of parent/guardian support for physical activity and nutrition as well as adult perceptions of support.

Previous research is inconclusive for parent/guardian physical activity and nutrition support being associated with improved youth health behaviors^(4, 34, 41, 45, 49, 50).

Therefore, it was not surprising that the current study did not show that parent/guardian physical activity and nutrition support were associated with more youth physical activity or healthier youth diets. It was unexpected, however, that parent/guardian support was significantly associated with higher youth BMI percentile-for-age: a risk factor for developing type 2 diabetes. The results of this study indicated higher levels of parent/guardian physical activity support were associated with higher youth BMI percentile-for-age ($r=0.433$, $p=0.013$) and higher parent/guardian nutrition support was correlated with youth BMI percentile-for-age ($r=0.406$, $p=0.021$). It should be noted that our study had a sample size of only 32 parent/guardian-child pairs being measured for this variable compared to other studies whose sample sizes ranged from nearly 400 to 1,000 participants ^(4, 41, 45, 49, 50). Nonetheless, this is the first study to report these relationships in American Indian parent/guardian child pairs. Despite the unanticipated directionality of the relationship between parent/guardian support and youth BMI percentile-for-age, an interesting qualitative theme emerged during the data collection process. Some parents/guardians commented as they filled out the physical activity support survey *“I don’t do this [support behavior], because my child is already very active on his/her own”* while others commented that *“I am always encouraging my child to get up and be active because otherwise he/she would just come home and sit on the couch.”* Although initially counter-intuitive, these comments might indicate a deeper driving force beneath parent/guardian support that this survey was unable to capture. These comments indicated that it might not be that certain youth are more active because their parents/guardians support them to be, but rather that the parents/guardians of less active children engage in more support and encouragement behaviors in a, perhaps

unsuccessful, effort to motivate their youth to be more active. In the same way, parents/guardians of overweight youth might be more inclined to encourage healthy eating habits than parents of non-overweight youth. Because correlation statistics are not concerned with determining causality, testing this hypothesis was beyond the scope of this research. The reasons for parents/guardians engaging in, or abstaining from, support behaviors for youth physical activity and nutrition have not been assessed in the American Indian population. Future research could examine the factors that promote parent/guardian support for youth behaviors as well as teasing out differences between types of support. The findings from the present study could also be expanded by including youth reported values of perceived parent/guardian support for nutrition and physical activity to determine any influencing disparities between the two constructs.

There was a weak trend ($r=-0.308$, $p=0.265$) for parent/guardian nutrition support to be associated with decreased youth percentage of dietary intake (kcal) from fat. These findings were expected and are similar to the findings of Hewitt and Stevens, Young et al., and, Zabinski et al.^(21, 49, 50). This result is encouraging to the extent that it indicates the possibility that parent/guardian nutrition support may influence youth dietary behaviors, particularly percentage of dietary intake from fat, in this population. This study added to the body of research by assessing youth percentage of dietary intake from fat using the gold standard measure of 3-day diet records instead of using a food frequency questionnaire which provide a less rigorous estimate of the percentage of dietary fat intake by quantifying servings of various food groups (e.g., fruits and vegetables, high-fat foods).

It should also be noted that more parents/guardians described themselves as the primary decision maker in the home for food (n=32) than did for physical activity (n=26). Many parents/guardians who were not the primary food decision maker indicated that another adult in the household made the food decisions while those who were not the physical activity decision makers indicated that “each person” or “the kids” made the household physical activity decisions. This indicates that the youth in the study may have had more autonomy in their physical activity choices than in their food choices. The youth might also be separating their food behaviors from the behaviors of their households during this developmental period. During adolescence, individuals tend to shift towards independence in decision making about many behaviors as well as being more influenced by peer groups than family ^(3, 4, 50).

Previous research indicates that adult behavior modeling may play as much of a role on youth health behaviors as adult support ⁽⁴⁹⁾, while other research suggests that there is a minimal relationship between parent/guardian physical activity and youth physical activity ⁽⁴⁵⁾. The present research found that parent/guardian physical activity behavior was not strongly associated with youth moderate-to-vigorous physical activity or youth BMI percentile for age (Table 5). Trends between better parent/guardian nutrition and better youth nutrition were apparent, although not significant (Table 5). Parent/guardian nutrition was not, however, consistently or significantly associated with youth BMI percentile-for-age. This could be due to differences in parenting styles of the parents/guardians in this study or the community-wide nutrition environment in the communities sampled for this study. For example, a poorer nutrition environment (e.g., more convenience stores, less access to fresh produce, vending machines easily

accessible to youth) may negate or weaken expected associations between parent and youth dietary behaviors. The sample size of this study was also much smaller than previous studies (n=15 vs n>100^(4, 45, 48, 49)) and ethnically homogenous, and therefore not generalizable to non-American Indian, or larger populations. Finally, parent/guardian behavior might not hold as much influence on youth behavior as expected for several reasons; most notably, it does not teach youth skills for the behavior that they can employ as they move towards independence. While younger children might be likely to mimic their parents' behaviors, this trend dissipates during adolescence^(3, 4, 50).

A deficiency of this study is the use of mixed modalities to assess behavioral variables. The study could be improved by monitoring physical activity among the parents/guardians as well as the children (instead of self-report leisure-time physical activity for parents). The physical activity behavior survey proved cumbersome for the subjects: nine subjects either did not complete the survey or filled it out incorrectly to the point that their physical activity level could not be accurately calculated.

Limitations of the study:

Several limitations of this study have already been posed. The three largest limitations which could be remedied in future studies include: small sample size, incomplete cases of data, and lack of validated instruments. Sample size could be bolstered in future studies by surveying parents/guardians during the initial meeting or consent process for the youth program. Notifying the parents/guardians in advance and allowing them to schedule the measures could increase the likelihood of accessing parents/guardians. Once the parents/guardians have agreed to participate, complete cases of data could be improved by administering the entire survey battery orally. While there

are drawbacks to this approach (it is time consuming and increases the likelihood of the participants providing socially desirable responses), it would maximize the amount of complete and usable data collected. Another opportunity to increase full cases of data would be to increase the rigor of testing measures for the youth. Many youth in this study did not complete some of the measures which made comparisons between parent/guardian and youth pairs impossible. Additionally, completing reliability and validity testing and improving upon the parent/guardian survey measures to make them easier to complete might improve the response rate.

Study Strengths

Despite the presented limitations, this study had several strengths. American Indian populations are a difficult ethnic population to engage in research due to historical trauma and resistance to outside investigators. This study successfully engaged two Northern Plains Indian communities to participate in the research which may help mobilize tribal members and community resources for future health prevention programs and interventions. Additionally, this is the first study to assess parent/guardian knowledge for physical activity and nutrition, parent/guardian support for physical activity and nutrition, and parent/guardian physical activity and nutrition behaviors as they relate to youth risk factors for type 2 diabetes in an American Indian population. Although the sample size was less than anticipated, this study showed the feasibility of developing and administering surveys to American Indian parents/guardians regarding their knowledge, attitudes, and behaviors for youth physical activity and nutrition, as well as collecting diabetes risk factor measures in 10 to 14 year old American Indian youth.

Additionally, this study set the stage for future research to determine the robustness of these measurement tools in American Indian populations.

Conclusions and suggestions for continued research:

While parents/guardians have an influential role in the lives of adolescents, this role did not translate broadly to measurable outcomes concerning type 2 diabetes risk factors for the 10-14 year old youth in the study. Although this study was not conclusive regarding the influence of parent/guardian factors on youth disease risk factors, this topic merits further research in light of the increasing incidence of type 2 diabetes among youth. Obesity and obesity related health behaviors (high fat diet and sedentary lifestyle) are complex disease risk factors that are influenced by a myriad of social, environmental, psychological, genetic, and behavioral variables. Future research should address the composite effects of these variables as well as improving upon the developed survey battery to address the parent/guardian constructs measured in the present study.

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APPENDIX 1: INFORMED CONSENT

Informed Consent Form

Project Title: Assessing Adult Factors That Influence Type 2 Diabetes Risk Factors In American Indian Youth.

Project Sponsors and Tribal Approval

This project is sponsored by The National Institutes of Health and The University of Montana. The project is part of the Chippewa-Cree approved *JOURNEY* to Native Youth Health program that administers a diabetes and alcohol prevention curriculum to Rocky Boy youth, age 10 – 14 years old.

Local Project Directors: Priscilla Friede and Martin Parker – Rocky Boy Tribal Health, 395-4064

Project Coordinators: Christiana Ricci – 425-246-1359 and Blakely Brown – University of Montana, 406-243-6524.

Purpose: The purpose of this project is to gather information about things you know and do about physical activity and nutrition. You are being asked to complete 3 surveys so we can get a better picture of your health habits and other things that relate to diabetes risks in Chippewa-Cree youth.

What happens during the survey: You will meet with either Priscilla Friede or Martin Parker to complete the survey. Ms. Friede or Mr. Parker will explain the survey measures and make sure that you understand the study. Filling out the surveys should take about an hour.

Payment for participation: You will receive \$10.00 in cash for your time.

Risks, inconveniences, and discomforts: You might feel uncomfortable when you talk about your health behaviors. Be assured that no physical or long-lasting harm will result from participating, but if you are uncomfortable during the survey, you can withdraw at any time.

Benefits: Being a part of this study gives you a chance to help improve the health of the next generation of American Indians. By participating in this survey, you also might become more aware of your health behaviors.

Confidentiality: Project staff will keep all information from this study confidential. If the results of this study are written in a scientific journal or presented at a scientific meeting, information that might identify you or your child will not be used.

Compensation for Injury: Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms:

"In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University's Claims Representative of University Legal Counsel. (Reviewed by University Legal Counsel, July 6, 1993)"

Voluntary participation/withdrawal: Your decision to take part in this project is entirely voluntary. You may refuse to take part in the project or you may withdraw from the study at any time without penalty or loss of benefits to which you are normally entitled.

Subject's Statement of Consent

I have read the above descriptions of this study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I know that any questions I may have will be answered by PJ Friede or Martin Parker. I voluntarily agree to take part in this study. I understand that I will receive a copy of this consent form.

Printed Name of Participant_____

Signature of Participant _____ **Date**_____

Informed Consent Form

Project Title: Assessing Adult Factors That Influence Type 2 Diabetes Risk Factors In American Indian Youth.

Project Sponsors and Tribal Approval

This project is sponsored by The National Institutes of Health and The University of Montana. The project is part of the Crow approved *JOURNEY* to Native Youth Health program that administers a diabetes and alcohol prevention curriculum to Crow youth, age 10 – 14 years old.

Local Project Directors: Todd Wilson and Jeri Lyn Harris – Crow Tribal Health, 638-1891

Project Coordinators: Christiana Ricci – 425-246-1359 and Blakely Brown – University of Montana, 406-243-6524.

Purpose: The purpose of this project is to gather information about things you know and do about physical activity and nutrition. You are being asked to complete 3 surveys so we can get a better picture of your health habits and other things that relate to diabetes risks in Crow youth.

What happens during the survey: You will meet with either Todd Wilson or Jeri Lyn Harris to complete the survey. Mr. Wilson or Ms. Harris will explain the survey measures and make sure that you understand the study. Filling out the surveys should take about an hour.

Payment for participation: You will receive \$10.00 in cash for your time.

Risks, inconveniences, and discomforts: You might feel uncomfortable when you talk about your health behaviors. Be assured that no physical or long-lasting harm will result from participating, but if you are uncomfortable during the survey, you can withdraw at any time.

Benefits: Being a part of this study gives you a chance to help improve the health of the next generation of American Indians. By participating in this survey, you also might become more aware of your health behaviors.

Confidentiality: Project staff will keep all information from this study confidential. If the results of this study are written in a scientific journal or presented at a scientific meeting, information that might identify you or your child will not be used.

Compensation for Injury: Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms:

"In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University's Claims Representative of University Legal Counsel. (Reviewed by University Legal Counsel, July 6, 1993)"

Voluntary participation/withdrawal: Your decision to take part in this project is entirely voluntary. You may refuse to take part in the project or you may withdraw from the study at any time without penalty or loss of benefits to which you are normally entitled.

Subject's Statement of Consent

I have read the above descriptions of this study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I know that any questions I may have will be answered by Todd Wilson or Jeri Lyn Harris. I voluntarily agree to take part in this study. I understand that I will receive a copy of this consent form.

Printed Name of Participant_____

Signature of Participant _____ **Date**_____

APPENDIX 2: PARENT/GUARDIAN SURVEY INSTRUMENT

Parent/Guardian JOURNEY Survey

1. Age (years): _____
2. ☐ Female ☐ Male
3. Ethnicity:
 - ☐ Native American or Alaska Native ☐ Hispanic or Latino
 - ☐ White, not Hispanic ☐ Black or African American
 - ☐ Asian ☐ Native Hawaiian or Pacific Islander
4. Tribal affiliation:
 - ☐ Not a tribal member
 - ☐ Tribal member, enrolled member of _____ tribe.
5. Yearly family income (check the box next to the range that best applies):
 - ☐ \$ 00.00 - \$10,000 ☐ \$10,000 - \$20,000 ☐ \$20,000 - \$30,000
 - ☐ \$30,000 - \$40,000 ☐ \$40,000 - \$50,000 ☐ \$50,000 – above
 - ☐ Don't know family income
6. Years of school completed:
 - ☐ Less than high school ☐ High school diploma/GED ☐ Some college
 - ☐ Associate's degree ☐ College degree ☐ Graduate degree
7. Are you the person in the household who makes most of the day-to-day food decisions?
 - ☐ Yes ☐ No: if no, who _____
8. Are you the person in the household who makes the most of the day-to-day decisions about physical activity?
 - ☐ Yes ☐ No: if no, who _____
9. What is your relationship to the boy or girl participating in this study?
 - ☐ Birth parent ☐ Other family member: _____
 - ☐ Legal Guardian ☐ Other: _____

Parent Knowledge and Support Questionnaire

1. Children need at least _____ minutes of physical activity a day, _____ days per week.
2. Does this physical activity need to happen at one time or can it be added up over the whole day?
☐ at one time ☐ over the whole day
3. Which of the following are examples of physical activity (check all that apply)
☐ walking ☐ riding bikes
☐ ranch chores ☐ watching basketball
☐ football video games ☐ dancing
4. Can physical activity and good nutrition reduce risk of type 2 diabetes?
☐ yes ☐ no
5. Children should eat _____ servings of fruits and vegetables each day.
6. Whole grains, fruits, and starchy vegetables are good sources of:
☐ fat ☐ protein ☐ carbohydrate
7. Low fat sources of protein are (check all that apply)
☐ extra lean ground beef ☐ American cheese
☐ hot dogs ☐ skim milk
☐ skinless chicken ☐ pinto or black beans
8. Which of the following are whole-grains?
☐ Raisin Bran cereal and oatmeal
☐ White rice and white, enriched breads
☐ Brown rice and whole wheat breads
☐ don't know

9. The term “Added Sugars” on the Nutrition Facts label means

- ☐ Sugars that naturally occur in the food
- ☐ Sugars that supply calories but few or no nutrients
- ☐ Sugars that supply calories and lots of nutrients
- ☐ Don’t know

10. The foods my child eats now can affect his or her health later in life

- ☐ yes, I agree
- ☐ no, I disagree

11. It is important for my child to get at least 3 servings per day of fat-free or low fat milk or milk products like cheese, yogurt, or fortified calcium drinks.

- ☐ True
- ☐ False

12. Which of the following would be the best, low-fat choice for an after-school snack for your adolescent:

- ☐ French fries and a diet pop
- ☐ chocolate chip cookies and Kool-Aid
- ☐ banana and low-fat milk
- ☐ don’t know

13. Which of the following will get rid of the most fat in ground meat before eating it?

- ☐ frying the meat until it is well done
- ☐ cooking the meat without using oil
- ☐ cooking the meat and then draining it and rinsing it with hot water
- ☐ don’t know

14. Which part of a food label tells how much fat it in the food?

- ☐ the brand name
- ☐ the ingredients
- ☐ the nutrition facts
- ☐ don't know

15. It is most important for which group of children to be physically active

- ☐ Overweight children
- ☐ Average weight children
- ☐ All children

16. Once children are in middle school it is less important for them to get physical activity

- ☐ True
- ☐ False

17. If my adolescent is breathing hard, sweating, or tired after 5 minutes of activity, he or she is probably working too hard and needs to stop.

- ☐ True
- ☐ False

18. My adolescent is in a PE class at school so he/she does not need to get any more physical activity outside of school.

- ☐ I agree
- ☐ I disagree

Select the number that best describes how often in the past **three** months you have said or done what is described below to your child who is participating in this program.

none	rarely	a few times	often	very often	does not apply
1	2	3	4	5	8

In the last 3 months:

- | | |
|---|-----------|
| 1. I exercised with my child | |
| 2. I offered to exercise with my child | 1. _____ |
| 3. I gave my child reminders to exercise
("Are you going to exercise tonight?") | 2. _____ |
| | 3. _____ |
| 4. I changed my schedule so we could be
active together | 4. _____ |
| 5. I discussed physical activity with my
child. | 5. _____ |
| 6. I complained about the time my child
spent being physically active. | 6. _____ |
| 7. I criticized or made fun of my child for
being physically active. | 7. _____ |
| 8. I gave my child rewards for being
physically active (bought something or
gave him/her something). | 8. _____ |
| 9. I planned for physical activity on outings
with my child. | 9. _____ |
| 10. I helped my child plan activities around
physical activity. | 10. _____ |
| 11. I asked my child for ideas on how I
could be more physically active. | 11. _____ |
| 12. I talked to my child about how much I
like to be physically active. | 12. _____ |
| 13. I provided transportation so my child
could go to places where he or she
could be physical activity or do sports
(gym, fitness center, etc). | 13. _____ |
| 14. I watched my child do physical activity/
sports | 14. _____ |
| 15. I told my child that he or she is doing
well in physical activity/ sports | 15. _____ |

Select the number that best describes how often in the past **three** months you have said or done what is described below to your child who is participating in this program.

none	rarely	a few times	often	very often	does not apply
1	2	3	4	5	8

In the last 3 months:

- | | |
|--|-----------|
| 1. I encouraged my child to eat healthier snacks when he or she is tempted to eat “unhealthy foods” (cake, chips). | 1. _____ |
| 2. I discussed my child’s eating habits with him or her | 2. _____ |
| 3. I reminded my child not to eat high fat, high salt foods. | 3. _____ |
| 4. I complimented my child on his or her eating habits (“Keep it up!” “I am proud of you”) | 4. _____ |
| 5. I noticed and commented if my child changed his or her eating habits. | 5. _____ |
| 6. I ate high fat or high salt foods in front of my child. | 6. _____ |
| 7. I refuse to eat the same healthy foods my child eats. | 7. _____ |
| 8. I brought home foods that I know my child is trying not to eat. | 8. _____ |
| 9. I got angry if my child encouraged me to eat low salt, low fat foods. | 9. _____ |
| 10. I offered my child foods that I know he or she is trying not to eat. | 10. _____ |
| 11. I buy candy, regular pop, or high fat snack food for my adolescent | 11. _____ |
| 12. I encourage my child to eat fruits or vegetables at every meal | 12. _____ |
| 13. I talk to my child about eating healthy | 13. _____ |
| 14. I let my child cook, help cook, or help plan meals. | 14. _____ |
| 15. I introduce many different fruits and vegetables to my child. | 15. _____ |

Jogging (outdoor, treadmill) . . .	1	Football/Soccer	14	Stair Master	27
Swimming (laps, snorkeling) . . .	2	Racquetball/Handball/Squash	15	Fencing	28
Bicycling (indoor, outdoor) . . .	3	Horseback riding	16	Hiking	29
Softball/Baseball	4	Hunting	17	Tennis	30
Volleyball	5	Fishing	18	Golf	31
Bowling	6	Aerobic Dance/Step Aerobic	19	Canoeing/Rowing/Kayaking . . .	32
Basketball	7	Water Aerobics	20	Water skiing	33
Skating (roller, ice, blading) . . .	8	Dancing (Square, Line, Ballrm)	21	Jumping rope	34
Martial Arts (karate, judo)	9	Gardening or Yardwork	22	Snow skiing (X-country/Nordic trk	35
Tai Chi	10	Badminton	23	(downhill)	36
Calisthenics/Toning exercises . .	11	Strength/Weight training . . .	24	Snow shoeing	37
Wood Chopping	12	Rock climbing	25	Yoga	38
Water/coal hauling	13	Scuba Diving	26	Other	39
Walking for exercise (outdoor, indoor at mall or fitness center, treadmill)					40

[illegible]

- 61

6. Have you had a job for more than one month over this past year, from last _____ to this _____?

List all JOBS that the individual held over the past year for more than one month. Account for all 12 months of the past year. If unemployed/disabled/retired/homemaker/student during all or part of the past year, list as such and probe for job activities of a normal 8 hour day, 5 day week.

Job Name	Job Code	Walk or bicycle to/from work Min/Day	AVERAGE JOB SCHEDULE			Out of the total # of "Hrs/Day" the individual reported working at this "job", how much of this time was usually spent sitting? Enter this # in "Hrs Sitting" column, then place a check "✓" in the category which best describes their job activities when they were not sitting.			
			Mos/Yr	Day/Wk	Hrs/Day	Hrs spent sitting at work Hrs Sitting	Check the category that best describes job activities when not sitting A B C		

Category A

(includes all sitting activities)

Sitting
Standing still w/o heavy lifting
Light cleaning - ironing,
cooking, washing, dusting
Driving a bus, taxi, tractor
Jewelry making/weaving
General office work
Occasional/short distance walking

Category B

(includes most indoor activities)

Carrying light loads
Continuous walking
Heavy cleaning - mopping, sweeping,
scrubbing, vacuuming
Gardening - planting, weeding
Painting/Plastering
Plumbing/Welding
Electrical work
Sheep herding

Category C

(heavy industrial work, outdoor construction, farming)

Carrying moderate to heavy loads
Heavy construction
Farming — hoeing, digging
— mowing, raking
Digging ditches, shoveling
Chopping (ax), sawing wood
Tree/pole climbing
Water/coal/wood hauling

JOB CODES

Not employed outside of the home:

1. Student
2. Home Maker
3. Retired
4. Disabled
5. Unemployed

Employed (or volunteer):

6. Armed Services
7. Office worker
8. Non-office Worker

[illegible]

- Fill in the circles completely, and erase completely if you make any changes.

SEX	AGE	WEIGHT pounds	HEIGHT ft. in.
<input type="radio"/> Male <input type="radio"/> Female			
If female, are you pregnant or breast feeding?			
<input type="radio"/> No <input type="radio"/> Yes <input type="radio"/> Not female			

*Sometimes we ask "how much" as A, B, C or D. LOOK AT THE ENCLOSED PICTURES. For each food, pick the picture (bowls or plates) that looks the most like the serving size you usually eat. (If you don't have pictures: A=1/4 cup, B=1/2 cup, C=1 cup, D=2 cups.)

TYPE OF FOOD	HOW OFTEN IN THE PAST YEAR								HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D					
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY					
Apple juice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses each time	<input checked="" type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Rice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much each time	<input type="radio"/> A	<input type="radio"/> B	<input checked="" type="radio"/> C	<input type="radio"/> D

PLEASE DO NOT WRITE IN THIS AREA

PLEASE DO NOT WRITE IN THIS SPACE

37284

TYPE OF FOOD	HOW OFTEN IN THE PAST YEAR									HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D				
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY					
How often do you eat each of the following foods all year round?														
Eggs, including egg biscuits or Egg McMuffins (Not egg substitutes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many eggs each time	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Bacon or breakfast sausage, including sausage biscuit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many pieces	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Cooked cereals like oatmeal, cream of wheat or grits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Which bowl		<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Cold cereals like Corn Flakes, Cheerios, Special K, fiber cereals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Which bowl		<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Which cereal do you eat most often? MARK ONLY ONE: <input type="radio"/> Bran Buds, Raisin Bran, Fruit-n-Fiber, other fiber cereals <input type="radio"/> Product 19, Just Right, Total <input type="radio"/> Other cold cereal, like Corn Flakes, Cheerios, Special K														
Cheese, sliced cheese or cheese spread, including on sandwiches.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many slices	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Yogurt (not frozen yogurt)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
How often do you eat each of the following fruits?														
Bananas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many each time	<input type="radio"/> 1/2	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Apples or pears	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many	<input type="radio"/> 1/2	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Oranges, tangerines, not including juice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many	<input type="radio"/> 1/2	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
Applesauce, fruit cocktail, or any canned fruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Any other fruit, like grapes, melon, strawberries, peaches, applesauce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D

TYPE OF FOOD	HOW OFTEN IN THE PAST YEAR									HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D				
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY					
How often do you eat each of the following vegetables, including fresh, frozen, canned or in stir fry, at home or in a restaurant?														
French fries, fried potatoes or hash browns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
White potatoes not fried, incl. boiled, baked, mashed & potato salad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Sweet potatoes, yams, or sweet potato pie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Rice, or dishes made with rice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Baked beans, chili with beans, pintos, any other dried beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Refried beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Green beans or green peas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Broccoli	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Carrots, or stews or mixed vegetables containing carrots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Spinach, or greens like collards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Cole slaw, cabbage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Green salad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Raw tomatoes, including in salad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> 1/4	<input type="radio"/> 1/2	<input type="radio"/> 1	<input type="radio"/> 2
Catsup, salsa or chile peppers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How many TBSP.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Salad dressing or mayonnaise (Not lowfat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How many TBSP.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Any other vegetable, like corn, squash, okra, cooked green peppers, cooked onions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Vegetable soup, vegetable beef, chicken vegetable, or tomato soup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Which bowl	<input type="radio"/>	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D

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PLEASE DO NOT WRITE IN THIS AREA



TYPE OF FOOD	HOW OFTEN IN THE PAST YEAR								HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D					
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY					
MEATS														
Do you ever eat chicken, meat or fish? <input type="radio"/> Yes <input type="radio"/> No IF NO, SKIP TO NEXT PAGE														
Hamburgers, cheeseburgers, meat loaf, at home or in a restaurant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much meat	<input type="radio"/> 1/8 lb.	<input type="radio"/> 1/4 lb.	<input type="radio"/> 1/2 lb.	<input type="radio"/> 3/4 lb.
Tacos, burritos, enchiladas, tamales	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Beef steaks, roasts, pot roast, or in frozen dinners or sandwiches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Pork, including chops, roasts, or dinner ham	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
When you eat beef or pork, do you <input type="radio"/> Avoid eating the fat <input type="radio"/> Sometimes eat the fat <input type="radio"/> Often eat the fat <input type="radio"/> I don't eat meat														
Mixed dishes with meat or chicken, like stew, corned beef hash, chicken & dumplings, or in frozen meals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Fried chicken, at home or in a restaurant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	# medium pieces	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Chicken or turkey not fried, such as baked, grilled, or on sandwiches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
When you eat chicken, do you <input type="radio"/> Avoid eating the skin <input type="radio"/> Sometimes eat the skin <input type="radio"/> Often eat the skin <input type="radio"/> N/A														
Fried fish or fish sandwich, at home or in a restaurant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Any other fish or shellfish not fried, including tuna	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D
Hot dogs, or sausage like Polish, Italian or Chorizo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
Bologna, sliced ham, turkey lunch meat, other lunch meat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many slices	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
When you eat lunch meats, are they <input type="radio"/> Usually low-fat <input type="radio"/> Sometimes <input type="radio"/> Rarely low-fat <input type="radio"/> N/A														

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TYPE OF FOOD	HOW OFTEN IN THE PAST YEAR								HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D														
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY														
Pasta, breads, spreads, snacks																							
Spaghetti, lasagna, or other pasta <u>with</u> tomato sauce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D									
Cheese dishes <u>without</u> tomato sauce, like macaroni and cheese	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D									
Pizza, including carry-out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many slices	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Biscuits, muffins	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many each time	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Rolls, hamburger buns, English muffins, bagels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many each time	<input type="radio"/> 1/2	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3									
White bread or toast, including French, Italian, or in sandwiches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many slices	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Dark bread like rye or whole wheat, including in sandwiches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many slices	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Tortillas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many each time	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Margarine on bread, potatoes or vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many pats (Tsp.)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Butter on bread, potatoes or vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many pats (Tsp.)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Peanuts or peanut butter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many TBSP.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Snacks like potato chips, corn chips, popcorn (Not pretzels)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D									
Doughnuts, cake, pastry, pie	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many pieces	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4									
Cookies (Not lowfat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many	<input type="radio"/> 1-2	<input type="radio"/> 3-5	<input type="radio"/> 6-7	<input type="radio"/> 8+									
Ice cream, frozen yogurt, ice cream bars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How much	<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D									
When you eat ice cream or frozen yogurt, is it	<input type="radio"/> Usually low-fat <input type="radio"/> Sometimes <input type="radio"/> Rarely low-fat <input type="radio"/> N/A																						
Chocolate candy, candy bars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many bars	<input type="radio"/> small	<input type="radio"/> medium	<input type="radio"/> large	<input type="radio"/> large									

TYPE OF BEVERAGE	HOW OFTEN IN THE PAST YEAR								HOW MUCH EACH TIME SEE PORTION SIZE PICTURES FOR A-B-C-D	
	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	TWICE per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK		EVERY DAY
How often do you drink the following beverages?										
Real orange or grapefruit juice, Welch's grape juice, Minute Maid juices, Juicy Juice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses each time 1 2 3 4
Hawaiian Punch, Sunny Delight, Hi-C, Tang, or Ocean Spray juices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses each time 1 2 3 4
Kool Aid, Capri Sun or Knudsen juices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses each time 1 2 3 4
Instant breakfast milkshakes like Carnation, diet shakes like Slimfast, or liquid supplements like Ensure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses or cans 1 2 3 4
Glasses of milk (any kind)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses 1 2 3 4
When you drink glasses of milk what kind do you usually drink? MARK ONLY ONE:	<input type="radio"/> Whole milk <input type="radio"/> Non-fat milk <input type="radio"/> I don't drink milk or soy milk <input type="radio"/> Reduced fat 2% milk <input type="radio"/> Rice milk <input type="radio"/> Low-fat 1% milk <input type="radio"/> Soy milk									
Cream, Half-and-Half or non-dairy creamer in coffee or tea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Total TBSP. on those days 1 2 3-4 5+
Regular soft drinks, or bottled drinks like Snapple (<u>Not</u> diet drinks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many bottles or cans 1 2 3-4 5+
Beer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many bottles or cans 1 2 3-4 5+
Wine or wine coolers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many glasses 1 2 3-4 5+
Liquor or mixed drinks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	How many drinks 1 2 3-4 5+

During the past year, have you taken any vitamins or minerals regularly, at least once a month?

- ☐ No, not regularly ☐ Yes, fairly regularly

(IF YES) WHAT DID YOU TAKE FAIRLY REGULARLY?

VITAMIN TYPE	HOW OFTEN					FOR HOW MANY YEARS?					
	DIDN'T TAKE	A FEW DAYS per MONTH	1-3 DAYS per WEEK	4-6 DAYS per WEEK	EVERY DAY	LESS THAN 1 YR.	1 YEAR	2 YEARS	3-4 YEARS	5-9 YEARS	10+ YEARS
Multiple Vitamins. Did you take...											
Regular Once-A-Day, Centrum, or Thera type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stress-tabs or B-Complex type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antioxidant combination type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Single Vitamins (not part of multiple vitamins)											
Vitamin A (not beta-carotene)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beta-carotene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamin C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamin E	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Folic acid, folate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calcium or Tums, alone or combined with vit. D or magnesium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zinc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Selenium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamin D, alone or combined with calcium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you took vitamin C or vitamin E:

How many milligrams of **vitamin C** did you usually take, on the days you took it?

- ☐ 100 ☐ 250 ☐ 500 ☐ 750 ☐ 1000 ☐ 1500 ☐ 2000 ☐ 3000+ ☐ don't know

How many IUs of **vitamin E** did you usually take, on the days you took it?

- ☐ 100 ☐ 200 ☐ 300 ☐ 400 ☐ 600 ☐ 800 ☐ 1000 ☐ 2000+ ☐ don't know

How often do you use fat or oil in cooking?

- ☐ Less than once per week ☐ A few times per week ☐ Once a day ☐ Twice a day ☐ 3+ per day

What kinds of fat or oil do you usually use in cooking? **MARK ONLY ONE OR TWO**

- ☐ Don't know, or Pam ☐ Butter/margarine blend ☐ Lard, fatback, bacon fat
☐ Stick margarine ☐ Low-fat margarine ☐ Crisco
☐ Soft tub margarine ☐ Corn oil, vegetable oil
☐ Butter ☐ Olive oil or canola oil

Did you ever drink more beer, wine or liquor than you do now? ☐ Yes ☐ No

Do you smoke cigarettes now? ☐ Yes ☐ No

IF YES, On the average about how many cigarettes a day do you smoke now?

- ☐ 1-5 ☐ 6-14 ☐ 15-24 ☐ 25-34 ☐ 35 or more

What is your ethnic group? (MARK ONE OR MORE)

- ☐ Hispanic or Latino ☐ Black or African American ☐ American Indian or Alaska Native
☐ White, not Hispanic ☐ Asian ☐ Native Hawaiian or Other Pacific Islander

Thank you very much for filling out this questionnaire. Please take a minute to go back and fill in anything you may have skipped.

PLEASE DO NOT WRITE IN THIS AREA